**Chapter 4: Continuous Random Variables and Probability Distributions**

1. **Continuous Random Variable**

**Continuous variables** produce outcomes that come from a **measurement**.

(e.g., your annual salary, or your weight). \*The amount of, ...

1. **Probability Density Function**

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**Chart, line chart

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**X1: discrete P(X1<3) = P(X1<=2)**

**X2: continuous P(X2<=3) = P(X2<3)**

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1. **Cumulative Distribution Function**

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**F’(X) = f(X)**

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1. **Mean and Variance of a Continuous Random Variable**

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1. **Distribution X ~ Binomial (n, p)**

| **Distribution** |  | **Notation** | **Range** | **Probability** | **Mean** | **Variance** |
| --- | --- | --- | --- | --- | --- | --- |
| **Continuous Uniform** |  |  |  |  |  |  |
| **Normal** |  |  |  | **CASIO** |  |  |
|  | **Binomial** |  |  | **CASIO** |  |  |
|  | **Poisson** |  |  | **CASIO** |  |  |
| **Exponential** |  |  |  |  |  |  |

**Probability is measured by the area under the curve. The total area under the curve is 1.**

**Poisson: mean = variance = lambda**

**Exponential: mean = standard deviation = 1/lambda**

1. **Continuous Uniform Distribution**

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X: a continuous uniform random variable over (a, b)

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1. **Normal Distribution**

Bell Shaped

Symmetrical

Mean, Median and Mode are Equal.

Location is determined by the mean, μ.

Spread is determined by the standard deviation, σ.

The random variable has an infinite theoretical range: -∞ to  +∞.

* **Calculating Normal Probabilities**

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X: a normal random variable with parameter and /

**The Standardized Normal Distribution (**Also known as the “Z” distribution)

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Mean is 0.

Standard Deviation is 1.

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Chapter 4: Continuous P(X>=4) = P(X>4) A

Chapter 3: Discrete P(X>=4) # P(X>4) BCD

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* **Given a Normal Probability. Find the X Value**

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X ~ N(mean, variance)

P(X<?)=0.2

X=?

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Text

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**Normal Approximation to the Binomial Distribution**

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**Normal Approximation to the Poisson Distribution**

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1. **Exponential Distribution**

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X: the distance between successive events

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